

REMARKS

Claims 1, 2, 4, 5, 7, 9-12, 14-16, 19, 20, 23, 26, 29, 34-64 are currently pending in this application. By this Amendment, claims 38, and 39 have been amended, and new claims 54-64 have been added. The amended claims set is provided herewith.

Applicant notes that claim 15 was not explicitly rejected by the Office Action, Applicant thereby assumes that claim 15 is allowable.

The amendments to claims 38 and 39 were made to correct an inadvertent typographical error. Support for newly added claims 54-61 can be found at least at paragraph 0007. Support for newly added claims 62-64 can be found at least in original claims 14-16.

§ 103 Rejection of Claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, and 26

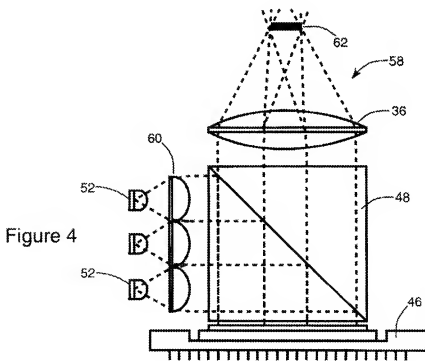
Claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, and 26 are rejected under 35 U.S.C. § 103 by Handschy, U.S. Patent No. 6,038,005, in view of Magarill, U.S. Patent No. 5,625,738. Applicant notes that claims 23, 34-45, and 47-53 were not called out in initial statement of the rejection, but were specifically addressed in the text of the rejection. Applicant respectfully traverses this rejection.

According to MPEP § 2142, three basic criteria must be met in order to establish a *prima facie* case of obviousness. First, the prior art reference (or references when combined) must teach or suggest all of the elements of the rejected claims. Second, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must **both** be found in the prior art (emphasis added). Applicant respectfully submits that a *prima facie* case has not been established with respect to the rejected claims.

With respect to claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, 23, 26, as well as claims 34-62. Applicant respectfully asserts that the prior art references fail to teach or suggest all of the elements of the rejected claims. The Office Action asserts that the references do not disclose that a “system of optical elements images the emitting surfaces of the light source modules”.

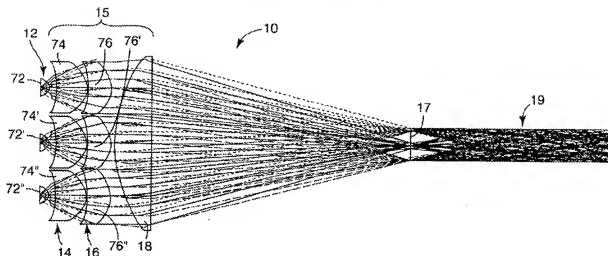
The Office Action alleges that “Handschy discloses an illumination system having a plurality of light source modules (Fig. 4, item 52), an illumination target (item 46), and a system of optical elements (items 60 and 48) disposed between the plurality of light source modules and the illumination target. The system of optical elements images the emitting surfaces of the light source modules onto the illumination target creating a plurality of images of the emitting surfaces (Fig. 4 and Col. 10, lines 36-45).”

Applicant disagrees with the construction given to Handschy by the Office Action. Specifically, the Applicant asserts that Handschy does not disclose **imaging the emitting surfaces of the light source module**. The Office Action is referring to item 46, the spatial light modulator as the illumination target. As can be seen from a comparison of Figure 4 of Handschy and Figure 1 of Applicant’s specification, it can clearly be seen that Handschy does not image the emitting surfaces of the light source modules onto the illumination target. As seen in Figure 4 of Handschy, no image of the light sources 52 is formed on what the Office Action is referring to as being equivalent to the illumination target, the spatial light modulator 46, instead the light from the light sources 52 is collimated onto the spatial light modulator.



Contrary to that, it can be seen below that the light sources 12 are imaged onto the entrance of the light tunnel 19, because the light rays converge at the entrance of the light tunnel.

Figure 1 (Applicant's)



The text of Handschy also indicates that the light sources are **not** imaged onto the spatial light modulator. Specifically, Handschy discloses that the “light sources 52 and their associated collimating lens 60, in cooperation with the other optics components, illuminate an associated portion of spatial light modulator 46 and produce a portion of an overall virtual image of the spatial light modulator illuminated by the associated light source. Therefore, an overall virtual image is formed which corresponds to overall spatial light modulator 46.” (Handschy, column 10, lines 38-45). Therefore, it can be seen that **Handschy does not disclose imaging the emitting surfaces of the light source module onto the illumination target, but instead images the illumination target.** Applicant asserts that Magarill also fails to teach or suggest imaging the emitting surfaces of the light source module.

Handschy does not disclose or suggest a system that can function to both homogenize the light that is imaged and minimize the angular spread at the viewing zone, and this combination of characteristics is, as seen in the formula provided by the Applicant's specification at paragraph 0006 and 0007, the basis for decreasing etendue degradation. Applicant also asserts that Magarill fails to teach or suggest decreasing etendue degradation, as is recited in claims 54-61.

Applicant respectfully asserts that the Office Action has failed to establish a *prima facie* case of obviousness because there is no suggestion or motivation to combine the cited references.

With respect to claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, 23, 26 Applicant asserts that there is no motivation to combine Handschy's device with the light tunnel of Magarill. The Office Action asserts that although Handschy does not explicitly teach the target is a light tunnel having an entrance, Magarill teaches a target that is a light tunnel having an entrance, and that therefore, one of skill in the art would have been motivated to utilize the light tunnel of Magarill in the illumination system of Handschy. From the text of the Office Action, the Applicant is unclear whether the Office Action asserts that the light tunnel can replace the spatial light modulator 46, or be placed somewhere else in the device of Handschy. However, Applicant asserts that regardless of the Office Action's method of combining the light tunnel of Magarill, one of skill in the art would not have been motivated to combine the two references.

The Office Action asserts that the spatial light modulator 46 is equivalent to the illumination target in the recited claims, and it is further asserted that it would have been obvious to use the light tunnel of Magarill as the illumination target of Handschy. Such a modification would render the device of Handschy unable to carry out its intended purpose. According to MPEP § 2143.01, there can be no motivation to modify a reference if such modification would render the modified device unworkable for its intended purpose.

Handschy describes the function of a spatial light modulator 30, which from the text of Handschy is equivalent to spatial light modulator 46 as "modulates light from light source 28 by selectively changing the polarization of the light passing through the spatial light modulator in response to data signal from writing arrangement 32." (Handschy, col. 6, lines 24-28). A light tunnel on the other hand is "a transparent light passageway having flat internally reflective side surfaces". Replacing the spatial light modulator of Handschy with the light tunnel of Magarill would render the device of Handschy unworkable for its intended purpose because a spatial light modulator and a light tunnel serve very different purposes.

Even assuming that a light tunnel could function within the device of Handschy in place of the spatial light modulator, one of skill in the art would not have been motivated to replace the spatial light modulator with a light tunnel, because the light tunnel would have to be very large.

As mentioned above, the purpose of Handschy is to provide a miniaturized optical system for use in eyepiece type devices. Replacing a portion of Handschy's device with a different portion that would be very large would render the device of Handschy unable to function for its intended purpose.

There is also no motivation to modify Handschy as suggested by the Office Action because Handschy is specifically directed to a "miniaturized image generating systems such as the miniaturized image generator disclosed" in a copending application (Handschy, Col. 1, lines 23-25), and the Applicant was concentrating on a projection system. Handschy notes that one of the ongoing challenges facing the manufacture of miniature image generating systems is providing smaller and smaller systems, which are small enough to be mounted onto a helmet or small enough to be supported by a pair of eyeglasses (Handschy, Col. 1, lines 34-38). Because Handschy's purpose is miniaturized systems, projection systems, one of skill in the art would not have been motivated to modify Handschy in order to create projection systems as the Applicant's were concentrating on.

With respect to newly added claims 54-61, Applicant respectfully asserts that Handschy does not disclose an illumination system that decreases etendue degradation as recited in claims 54-61.

With respect to newly added claims 62-64, Applicant respectfully asserts that Handschy does not disclose an illumination system that has a plurality of light channels aimed substantially into the illumination target as recited in claims 62-64.

Applicant also asserts that the obviousness rejection of claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, 23, 26 is unacceptable because it is based on impermissible hindsight reconstruction. Applicant asserts that the Office Action has simply looked to the Applicant's specification, or more specifically, a figure from the Applicant's specification and based on what is disclosed therein, has asserted that one of ordinary skill in the art would be motivated to modify Handschy to obtain the instant invention.

Applicant notes that although particular claims may not be addressed herein, Applicant does not concede the correctness of the statements pertaining to those claims that were made in the Office Action.

With respect to claim 10 and 41, Applicant respectfully submits that Handschy does not disclose a non-radially symmetrical aperture, as the Office Action asserts. The Office Action points to Figures 7A and 7B of Handschy as disclosing a non-radially symmetrical aperture. Figures 7A, and 7B of Handschy depict multiple planes and/or axes of symmetry, this is not consistent with what is referred to as non-radially symmetrical aperture in claim 10 (as well as claims 29, 41, and 58). As discussed at paragraph 0033, the non-radially symmetrical aperture is the area of the pupil that has the highest contrast, depicted in Figure 2A. Handschy does not disclose non-radially symmetrical apertures, as that term is utilized in the Applicant's specification and in claims 10, 29, 41, and 57.

With respect to claim 14 (as well as claim 15, 16, 45-47, 60, and 62-64) Applicant strongly disagrees with the Office Action regarding the construction of Handschy. The Office Action points to column 10, lines 45-51 as disclosing that the plurality of light channels are aimed substantially into the illumination target. The text from column 10, lines 45-51, which is referring to Figure 4 is provided below:

"Although only three rows of three light sources and their associated collimating lenses are described, it should be understood that the array of light sources and their collimating lenses may include a wide variety of numbers of light sources, which may be of different colors, and collimating lenses depending on the specific requirements of the situation."

Applicant respectfully disagrees that this text says anything with regard to the direction in which the light sources are aimed. Applicant also notes that there is no further text or figures in Handschy that disclose or suggest a plurality of light channels aimed substantially into the illumination target.

With respect to claim 16, Applicant notes that it is dependent on claim 14, and as Applicant has noted above, Handschy does not disclose or suggest a plurality of light channels aimed substantially into the illumination target.

With respect to claims 23 and 52, the Office Action asserts that Handschy discloses a system of optical elements having dichroic mirrors, the Office Action specifically points to item 48, column 7, line 6. Applicant asserts that the polarizing beamsplitter 48 of Handschy, Fig. 2B and Col. 7, line 6, is **not** a dichroic mirror. The polarizing beamsplitter 48 of Handschy separates

polarizations of light, essentially independent of their color, whereas a dichroic mirror separates colors.

With respect to claim 26 and 51, the Office Action asserts that column 19, lines 62-63 discloses that the first, second and third colors are primary colors. Applicant respectfully disagrees, and notes that lines 62-63 of column 19 of Handschy discusses characteristics of the polarizing beam splitting film.

With respect to claim 53, the Office Action asserts that Handschy discloses a system of optical elements having a lenticular array (Fig. 4, item 60 and column 10, lines 35-36). The Applicant respectfully asserts that this particular portion of Handschy refers to collimating lenses, not lenticular lenses. A collimating lens and a lenticular lens are different.

In light of the comments offered above, Applicant respectfully requests that the rejection of claims 1, 2, 4, 5, 7, 9-12, 14, 16, 19, 20, and 26 as obvious over Handschy in view of Magarill be withdrawn.

§ 103 Rejection of Claim 29

Claim 29 is rejected under 35 U.S.C. § 103 by Handschy, U.S. Patent No. 6,038,005, in and Magarill, U.S. Patent No. 5,625,738 and further in view of McClelland, U.S. Patent No. 6,201,629. Applicant respectfully traverses this rejection.

Again, the Applicant asserts that the Office Action has failed to establish a *prima facie* case of obviousness, at least because all of the elements have not been taught or suggested by the references.

With respect to claim 29, Applicant respectfully submits that Handschy does not disclose a non-radially symmetrical aperture, as the Office Action asserts. The Office Action points to Figures 7a and 7b of Handschy as disclosing a non-radially symmetrical aperture. Figures 7A, and 7B of Handschy depict multiple planes and/or axes of symmetry, this is not consistent with what is referred to as non-radially symmetrical aperture in claims 10, 29, 41, and 58. As discussed at paragraph 0033, the non-radially symmetrical aperture is the area of the pupil that has the highest contrast, depicted in Figure 2A. Handschy does not disclose non-radially symmetrical apertures, as that term is utilized in the Applicant's specification.

Furthermore, Handschy does not disclose a non-radially symmetrical aperture with a long dimension and a short dimension that is oriented so that the long dimension is aligned with the pivot axis of the mirrors of the image-forming device. The Office Action states that the aperture of the mirror has a long dimension and a short dimension. Claim 29 recites that the non-radially symmetrical aperture has a long dimension and a short dimension, Handschy does not disclose this portion of claim 29, because as stated above, Handschy does not disclose a non-radially symmetrical aperture as that term is utilized in Applicant's specification.

Neither Magarill nor McClelland remedies these shortcomings of Handschy, and therefore, claim 29 is not obvious over Handschy, Magarill and McClelland. Applicant therefore respectfully requests that the rejection of claim 29 as obvious over Handschy, Magarill and McClelland be withdrawn.

§ 103 Rejection of Claim 46

Claim 46 is rejected under 35 U.S.C. § 103 by Handschy, U.S. Patent No. 6,038,005, in and Magarill, U.S. Patent No. 5,625,738 and further in view of Anderson, U.S. Patent No. 5,997,150. Applicant respectfully traverses this rejection.

Applicant reiterates the arguments above with respect to Handschy not imaging the emitting surfaces of the light source module, and not disclosing that the plurality of light channels are aimed substantially into the illumination target. In light of the comments offered above, Applicant respectfully requests that the rejection of claim 46 as obvious over Handschy, Magarill, and Anderson be withdrawn.

Response to Arguments

Applicant notes that the Examiner has referred to the discussion of claim 46 as providing motivation to combine the references. However, Applicant asserts that the discussion surrounding the rejection of claim 46 can only apply to the rejection of claim 46 and cannot simply be applied to all of the claims because the motivation that is discussed there concentrates on the specific elements of claim 46. Applicant therefore continues to assert that the Examiner has failed to show an acceptable motivation to combine the references.

In view of the foregoing amendments, Applicants respectfully request reconsideration and allowance of the claims as all rejections have been overcome. Early notice of allowability is kindly requested.

Please grant any extension of time, if necessary for entry of this paper, and charge any fee due for such extension or any other fee required in connection with this paper to Deposit Account No. 13-3723.

Respectfully submitted,

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